

The Social Economic Aspect in Selecting Priority Commodities in Community Forest Activities at Protected Forest Areas

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Abstract : The implementation of Community Forestry (CF) in protected forest area is not only intended to improve welfare of community living around forest but also restores the function of protected areas. This study aims to figure out the types of priority crops that can be developed in CF area based on legal aspect of the rules in protected forest areas and social economic aspect of community surround forest areas. The research was conducted for 4 months, on February – May 2020 in working areas of Meranti Wana Makmur Forest Farmers Group (Gapoktanhut), Lubuk Bintialo Village, Batanghari Leko District, Musi Banyuasin Regency. The result showed that according to provisions of utilization in protected forest areas, the types of crops which developed in the CF area, were multipurpose crops and based on social aspects 5 (five) types of crops that had grown and produced were Rubber, Jackfruit, Djenkol bean, Petai bean, and Durian was in “Fairly Priority” category. Therefore, based on the economic aspect, there were only 4 (four) multipurpose plant types of “profitable” categories, such as Jackfruit, Djenkol bean, Petai bean, and Durian. The type of short-term crops function as companion crops (intercrops) that was good for cultivation were Corn, Chili, Watermelon, and Melon.

Keywords: Protected forest areas, multi-purpose crops, priority crops, agroforestry, short-term crop

1. Introduction

Land forest degradation is a general topic for all kinds of damage or change of forest area beyond its designation [1]. One of the causes of degradation is land forest cultivation practice by community namely encroachers [2]. The existence of community in this area causes polemic in order to overcome it. One of the attempts to solve the problem is by encouraging community involvement to participate in responsible forest management [3]. Government through Ministry of Environment and Forestry initiates to prioritize social forestry concept in forest development.

The real manifestation of the implementation of community involvement is the stipulation of Ministry of Environment and Forestry regulation Number P.83/MenLHK/Kum.1/10/2016 related to social forestry. According to the regulation of social forestry is defined as sustainable forest management system implemented in state forest area or private / customary forest managed by local communities or customary law communities as the main actor to improve their welfare, environmental balance, and social cultural dynamics in the form of village forests, community forests, community plantation forests, customary forests and forestry partnerships [4]. The presence of management permit in social forestry opens up opportunities for community living around forest to legally utilize forest land (area) easily [5]. The management of forest land (area) is expected to be able

to fulfill some interest of parties, for farmers, it is a legal area for working and getting results as a support for family income, whereas for government in a long-term land management will restore “forested land” as the concept and essence of social forestry is social, economic, and ecology integration towards a prosperous community and sustainable forest [6]. In the middle of shrinking community management space due to the impact of forestry development and corporate based plantation, social forestry is a forestry management mechanism which offering community space management (access) [7].

Forest utilization built upon social forestry is adjusted to its function, namely production and protect: provide wood product, non-wood product, and service to others environment [8]. Regulation on social forestry No.P.39/MENLHK/SETJEN/KUM.1/6/2017 in the working area of forestry department in article 7, describes that Social Forestry Utilization Permit (IPHPS) at protected forest in effective land with cropping pattern: (a) wooden plant non fast growing species for land and water protection in 20% of area (twenty percent); (b) Multi Purpose Trees Species (MPTS) in 80% (eighty percent); and (c) crops under the stakes are crops other than tubers and/or other crops that cause land damage. Protected areas on the other hand have great potential as a conservation function, but on the other hand, “management should also be

carried out to provide benefits to managers (economic value) [9]. Integration and compromise between institutional aspects with economic and ecological aspects are things that must be taken in the management of protected area for both interests to run simultaneously [10].

2. Materials and Methods

2.1. Research Material

The research has done in 2 (two) stages, which in the first stage was doing a survey and transects to obtain an overview of potential types of crops that have grown up on social forestry land with descriptive quantitative analysis [11], while in the second stage was to formulate a process of determining priority crops species based on legal, social and economic aspects [12].

This study research was held in the location of Community Forest Social Forestry (CF) in Hamlet 6, Lubuk Bintialo Village, Batanghari Leko District, Musi Banyuasin Regency. The location was determined deliberately (purposely) with consideration that social forestry location at Lubuk Bintialo Village was in protected forest area and has been done more than 1 (one) year, and also has carried out institutional activities and land management.

The research was conducted for 4 (four) months on February – May 2020. The research tool used in this study was list of questionnaires as a guide media in the process of extracting qualitative data and was closed to correspondents, namely 44 members of the Meranti Wana Makmur Forest Farmers Group (FFG) of Lubuk Bintialo village. The questionnaire contains of 5 questions connected to research indicators, composed of 3 (three) questions to get information related to the marketing index (MI) and 2 (two) questions related to the social index (SI).

2.2. Research Method

The sampling method used was non probability sampling, which is sampling that are not based on probability rules and is deliberately chosen by the researcher to be the sample. The sampling technique applied is saturation sampling or determination sampling technique where all members of population is used as sample [13]. Meanwhile, the population in this research was member of Meranti Wana Makmur Forest Farmers Group (FFG), which was divided into 2 (two) group of farmers, specifically Meranti Jaya group with 25 (twenty five) members and Morodadi group with 19 (nineteen) members. Moreover, the data collection technique in this study consists of combination of various methods, summarized into a unity.

2.3 Data Analysis

The variables in this research composed of social and economic aspects. Social aspect consists of 2 indicator components, namely marketing and social. From the result of questionnaire data obtained, the next process was analyzed using Priority Plus Index (PPI) method [14]. In the PPI formulation, each of component (marketing and social indicator) have a scale value from 1 to 5 and places the two components in a balanced position which is denoted as follows:

$$PPI = MI * SI$$

Where:

PPI = Priority Plus Index

Mi = Market Index

Si = Social Index

The economic aspect is determined by a business feasibility analysis with the formulation of total costs, revenues, income, R/C and B/C ratio [15].

$$R/C \text{ ratio} = \frac{Y \cdot Py}{TCE + TCI} \approx R/C \text{ ratio} = \frac{TR}{TC}$$

Where :

R/C = Return Cost Ratio

Y = Output derived during production period (Kg)

Py = Price of production output (Rp/kg)

TCE = Variable Price (Rp)

TCI = Fix Cost (Rp)

TR = Revenue (Rp)

TC = Total Costs (Rp)

Criteria:

R/C > 1, said to be worth the effort

R/C = 1, said to break even

R/C < 1, said to be unworthy of the effort

$$B/C \text{ ratio} = \frac{TR - TCE}{TCE + TCI} \approx B/C \text{ ratio} = \frac{FI}{TC}$$

Where :

B/C = Benefit/Cost Ratio

TR = Revenue (Rp)

FI = Total Income (Rp)

Criteria :

B/C > 1, said to be worth the effort

B/C = 1, said to break even

B/C < 1, said to be unworthy of the effort

3. Results and Discussion

3.1. Types of Crops to be Developed in Community Forest Areas

In research on the Study of Tree Species Selection in Ilengi Agroforestry Based on Biophysical, Landscape and Socio-Economic Factors with the Local User Value Index (LUVI) approach, it is stated that the factors that determine farmers choose the types of trees planted on agroforestry land are tree biophysics,

landscape and climate, and socio-economic conditions [17]. The identification result of multi-purpose crops types that have grown well and produced, were derived from interviews (questionnaires) to all member of Forest Farmers Group (FFG) and ground-check survey to community land. Besides of questions related to 5 (five) multi-purpose plant types, there were also questions of 5 (five) types crops which already used as

companion crops (intercrops). Rubber crops by 20 respondents, Jackfruit crops by 15 respondents, *Archidendron pauciflorum* (Djenkol bean) crops by 7 respondents, *Parkia speciosa* (Petai bean) crops by 6 respondents, and *Durio zibethinus* (Durian) crops by 6 respondents. Therefore, the types of agricultural crops which often cultivated are Corn, Chili, Watermelon and Cassava.

Table 1. List of the Highest Rangking of Multipurpose Plant Types and Intercrops

Rangking	1	2	3	4	5
Multipurpose plant that grow well and produce	Rubber	Jackfruit	<i>Archidendron pauciflorum</i> (Djenkol bean)	<i>Parkia speciosa</i> (Petai bean)	<i>Durio zibethinus</i> (Durian)
Score	20	15	7	6	6
Types of crops as intercrops	Corn	Chili	Watermelon	Melon	Cassava
Score	12	10	9	7	6

3.2. Priority Plus Index (PPI) Analysis

3.2.1. Marketing Index Indicator

In the marketing Index, there are 3 (three) components of index, i.e. marketing purpose, continuity, and selling price perkilogram/grain. In the commodity marketing objective component, Rubber has highest score than the other community for 1.83 point. it is due the rubber selling generally on city level, such as Jambi and Sekayu. While Petai bean crops scored result lowest were in 1.34 while Petai bean crops lowest. has score were in 1.34, where the commodities was sold in village market.

The queries related to continuity of supply, Jackfruit and Petai bean have highest score value of 3.95 where those crops can product all the year round in Lubuk Bintialo village. Besides that, Jackfruit and Petai bean crops can be harvested without having to wait for the crops to ripen as it can be harvested whilst it is raw. The query related to commodity selling price indicator, Durian crop has the highest score with a value of 4.18. The reason was based on the fruits' selling price during harvest season, where frequently the price decreased at the main harvest time. Therefore, Rubber plants scored at 1.73. It happened since the price of Rubber influenced by the quality of sap and the remote location of Rubber plants from factory contributed to marketing problem for the high operational cost. Thus, the farmers prefer to sell their commodities at their village to collectors with a very low price per kilogram.

3.2.2. Social Index Indicator

There are 2 index components in Social Index measurement, namely, a commodity which is socially accepted and with institutional support for the commodity. In the indicator of "commodity is socially accepted", it is known that Durian crop has the highest score of 4.48. Their explanation was because Durian is known as type of crop that had grown naturally (*Durian Daun*) and had high economic value. At the meantime, Rubber plants scored in 4.18.

In opinion of the community, Rubber is categorized as plant that low maintenance cost and easy to care, thus, it is relatively suitable to grow in large land tenure. It is apart from knowledge related to the cultivation of Rubber crop that they had previously carried out in their origin before come to Lubuk Bintialo village. Hereinafter, for the inquiries of institutional support related to commodities studied, all the questionnaires stated there was no institution yet, which supported certain types of commodities. It is possible not only of planting certain types commodities that has not been applied in a large scale, but also in terms of community institutions that have not been properly developed. In 2018, according to community information, there was a discourse formation of a Rubber sap auction agency by the village office of Musi Banyuasin regency plantation, yet, it has not been.

Table. 2. Recap of Average Score of Marketing Index and Social Index

No	Question Variable	Score				
		Rubber	Jackfruit	Djenkol bean	Petai bean	Durian
A	Marketing Index (Mi)					
1	Marketing Objective	1.86	1.34	1.68	1.30	1.73
2	Supply Continuity	3.36	3.95	3.09	3.95	2.64
3	Selling Price Per Kilogram	1.73	3.00	3.02	2.16	4.18
Total Score		6.95	8.30	7.79	7.41	8.55
Average Score		2.32	2.77	2.60	2.47	2.85
B	Social Index (Si)					
1	Socially Accepted	4.18	3.23	3.73	3.73	4.48
2	Institutional Support	1.00	1.00	1.00	1.00	1.00
Total Score		5.18	4.32	4.73	4.73	5.48
Average Score		2.59	2.11	2.36	2.36	2.74

Data Source: Research Result 2020

3.2.3. *PPI Calculation Result*

It is significant to calculate score for each index variable that consists of 3 indicators on Marketing Index and Data Source 2 indicators on the Social Index, by adding up each indicator score, that were divided by the number of indicators provided. In accordance with PPI measurement formula, by placing all components

in a balanced position, the PPI value of each commodity is the multiplication result of the predetermined index variable indicator (marketing and Social). The results that all the commodities studied have prospect of being developed in the social forestry area in protected land of Lubuk Bintialo village.

Table 3. Scale, Rating of PPI Measurement Result

No	Commodity	MI	SI	PPI Value MI x SI	Commodity Priority Criteria
1	Rubber	2.32	2.59	6.01	Adequate
2	Jackfruit	2.77	2.11	5.84	Adequate
3	Djenkol bean	2.60	2.36	6.14	Adequate
4	Petai bean	2.47	2.36	5.84	Adequate
5	Durian	2.85	2.74	7.80	Adequate

3.3. *Based on Economic Aspect*

In a study on the Selection of Plant Types and Planting Patterns in Agroforestry Management in Kalianda District, South Lampung Regency, Lampung Province, it was suggested that the type selection was developed based on income (production economy), production continuity, harvest period, local culture and the ability to support other crops [16]. In this research, the benefit method analysis is used by counting 5 (five) types of commodities that mostly chosen, namely Rubber, Jackfruit, Djenkol bean, Petai bean and Durian commodities. The results of the analysis are the conclusions related to the feasibility of plant species to be cultivated on community's land based on predetermined criteria. Therefore, in relation with measurement of cost and revenues in this analysis, commodity crops are calculated based on the initial costs of planting to harvesting, assuming a tree age of 5 years (productive age) living in 2 hectares of managed land. Hence, the information needed in measurement of benefit analysis is (1) production costs consisting of fixed costs and variable costs, (2) the

value of labor wages, (3) labor costs, (4) production output and selling price and (5) production and acceptance schedule [23]. types and prices of equipment and equipment needed are determined based on common used of type and quality, as well as the prices applied in the research area.

3.3.1. *Fixed Costs (FC)*

Fixed Cost can be defined as cost incurred regardless of the output issued. Fixed costs in this research are the costs of procuring equipment and equipment needed which permanent in accordance to the economic life of goods for 5 years. The cost required is calculated for the initial process of land preparation until harvesting year (5 years). Rubber commodity requires higher fixed costs than other types of commodities, i.e. IDR 5,945,000. The factor that causes high fixed costs in the Rubber plant business is the provision of equipment and equipment in the form of sap bowls and tapping knives which are very important equipment in the Rubber plantation business. On the other hand, Jackfruit, Djenkol bean, Petai bean and Durian crops require the same fixed costs of IDR

745,000 in two hectares. Unlike Rubber, plants, Jackfruit, Djenkol bean, Petai bean and Durian plants do not require additional equipment, except for commonly used equipment in mineral land agricultural practices, in the form of hoes, sickles, machetes and hand-sprayers.

3.3.2. Variable Costs

Variable costs are costs which follow the amount of output produces. In farming activities, the types of variable costs that must be incurred including the costs of procuring seeds, fertilizers, herbicides, pesticides, and other necessities related to the harvesting process and maintenance as labor. However, the need for labor in land processing process is not counted as a variable cost, for all the works is done by the farmers who manage the land by themselves. Therefore, the harvesting process costs are added as variable costs for work which cannot be done by smallholders themselves, such as labor and transport costs.

Durian crop business requires the highest variable costs, which are IDR 40,000,000 due to the fact that Durian seeds are relatively more expensive compared to other multipurpose plant types. Rubber plants require a variable cost of IDR 38,450,000, which consists of the procurement of seeds of IDR 12,000,000, where with a spacing of 5m x 4m, 1000 seeds are needed at a price of IDR 12,000. Fertilization costs IDR 15,000,000, pesticides costs IDR 4,000,000, herbicides costs IDR 6,000,000 and the cost of purchasing frozen liquid at IDR 1,200,000 for a year of sap production. Meanwhile, Jackfruit, Djenkol bean and Petai bean crops require relatively the same seed costs and maintenance, namely, the seed price.

3.3.3. Total Cost (TC)

The total cost of farming activities consist of fixed costs and variable costs. The total costs can be said as the investment costs of farming. From Table 6, it is found the comparison costs of each plant. Rubber plants cost the highest investment cost compared to other plants, namely IDR 44,395,000 consisting of IDR 5,945,000 for fixed costs, and IDR 37, 250,000 for variable costs. Compared with variable costs, the low fixed costs happened because of the fact that there will be no land acquisition costs. Durian plants require lower investment costs, namely IDR 40,745,000, with details of IDR 745,000 as fixed costs, variable costs of IDR 40,000,000. As for the other three types of commodities, such as Jackfruit, it requires an investment cost of IDR 26,745,000, while for Djenkol bean and Petai bean, the total cost required are the same, IDR 24,345.000.

3.3.4. Results of annual production

Production yield per year is stated in the amount of monthly or seasonal production, which is in a 12 month period. In Table 4, it is known that the Jackfruit

crop produces the most fruit yields, around 10.000 fruits per year. It is because Jackfruit crop can bear throughout the months of the year, although in certain months it produces more fruit, specifically in the near dry season between February and March. In addition, Jackfruit crop can be harvested when the fruit still raw. Therefore, Durian crops produce 9.200 of fruits per year with only one harvest season, November to March each year. Rubber crops produce in average of 6.500 kilogram per year.

The production of Rubber latex is calculated based on the month of production each year, whenever several months in year of production is not as much as usual, especially during rainy season between November to February. Djenkol bean crops produce 5.800 kilograms of fruit per year. Similar to Jackfruit crops, Djenkol bean crops produce fruit throughout the month. However, there are certain months that produce more fruit, which is during dry season between May and July. As for Petai bean, it produces 6.800 kilograms of fruit per year with maximum production between October and January.

3.3.5. Price of Production

The price of production is the selling price of commodities at farm level. As shown in Table 4, it is known that of the 5 commodities studied, Rubber crops had the lowest production value, specifically IDR 5,500 per kilograms and relatively stable. It has been known that the basic price of Rubber is determined nationally, while at the farmer level, the price is influenced by the quality of sap and cost of transportation. Besides that, the low price of Rubber crops are also influenced by the middlemen as the collector at the local level. Meanwhile, for Jackfruit commodities, farmers in Lubuk Bintialo Village usually give selling price at the average price of IDR 7,500 per kilogram of fruit, For Djenkol bean crops in Table 4, it is known that its price per kilogram is IDR 10,000 for old Djenkol bean, while the raw ones sold for IDR 5,000 per kilogram.

Moreover, for Petai bean crop, village farmers of Lubuk Bintialo sell it to village collectors at the price of IDR 7,000 per kilogram. The price of Petai bean crop is relatively stable every month. As for Durian crops, farmers in Lubuk Bintialo village sell in average price of IDR 7,500 per bundle. Frequently, the price of Durian changes every harvest season, there are even differences in prices at the beginning of harvest season and towards the end of the harvest season. At the beginning of season, fruit prices tend to be highest (November) and falling at the peak of harvest season (December – January). The selling process of Durian crops to collectors are directly at the farmers' location with a bonded / cut pattern by traders from outside region.

3.3.5. Total Revenue

Total revenue is the result of calculating the amount of production per year multiplied by the average price of commodities. The total revenue in this study is the result of the total income from farming for a year which consists of income from fruit trees (multipurpose) and short term crops (intercrops). In Table 4, the Rubber plant business produces the lowest revenue, which is only IDR 35,750,000 per year.

In Rubber plantation business, the community does not need to plant intercrops, since based on experience, agroforestry cannot be used on Rubber plantations. It is because of relatively short distance between Rubber trees. Based on a comparison of the five types of crops studied, the highest revenue was for Jackfruit with the amount of IDR 92,000 per year, consisting of multipurpose plants of IDR 75,000,000 and intercropping plants of IDR 17,000,000. Meanwhile, the majority of short term plant types cultivated by Lubuk Bintialo village farmers are Corn and Chili crops since they are suitable for former forest land, besides of Watermelon and Melon crops. The average intercropping plants type in a quarter of a hectare with a path pattern between trees. Intercropping plants produce as much as 1000 kilograms of Corn and

Chili crops as much as 600 kilograms during the harvest period with alternating cropping pattern for a year. The average price of dry Corn is IDR 4,000 per kilogram, while the average price of Chili is IDR 25,000 per kilogram. Thus, the total cost required is IDR 1,000,000 which is only a variable cost. From the short term crops, farmers of Lubuk Bintialo village can produce IDR 17,000,000, specifically for Corn crops at the amount of IDR 3,000,000 and IDR 14,000,000 for Chili crops.

3.3.6. Total Income

Total Income is the calculation of total income minus total costs. It can be termed that total revenue is the value of profit or loss from a business activity. In accordance to Table 6, it is known that Jackfruit commodity produces the highest income for farmers in Lubuk Bintialo village, viz. IDR 70, 225,000 per year. Rubber plants are not generating income for farmers. Meanwhile, Djenkol bean, Petai bean and Durian crops are respectively provide almost the same income, among others: Djenkol bean as of IDR 50,655,000, Petai bean in amount of IDR 40,255,000 and Durian at the amount of IDR 45,255,000.

Table 4. Recap of Costs, Income and Receipts of each Commodity

Description	Types of Commodities				
	Rubber	Jackfruit	Djenkol bean	Petai bean	Durian
Fixed Cost (TCI)	5,945,000	745,000	745,000	745,000	745,000
Total Variabel Cost (TCE)	31,450,000	21,000,000	23,600,000	23,600,000	34,000,000
Total Cost (TC)	37,395,000	21,745,000	24,345,000	24,345,000	40,745,000
Production per kg/peryear (Y)	6,000	10,000	5,800	6,800	9,200
Production Price (Py)	5,500	5,000	10,000	7,000	7,500
Crop Acceptance MG	35,750,000	75,000,000	58,000,000	47,600,000	69,000,000
Income of other Commodities	0	17,000,000	17,000,000	17,000,000	17,000,000
Total Receipt (FI)	35,750,000	92,000,000	75,000,000	64,600,000	86,000,000
Total Revenue (TR)	(1,645,000)	70,255,000	50,655,000	40,255,000	45,255,000

Based on Table 5, it is known that in calculation of the R/C and B/C analysis, the Rubber plant has a value of less than 1, while for the other 4 types of plants, each has a value of more than 1. It means that

according the economic analysis of the Rubber plant is multipurpose plant which is not suitable for.

Table 5. Recap of analysis results based on the Marketing, Social, and Economic aspects of selected commodities.

No	Commodity	Score Mi and Si	Criteria of PPI	Economic Analysis		Economic Criteria
				RC	BC	
1	Rubber	6.01	Adequate	-0.04	0.96	Not feasible
2	Jackfruit	5.84	Adequate	3.23	4.23	Feasible
3	Djenkol bean	6.14	Adequate	2.08	3.08	Feasible
4	Petai bean	5.84	Adequate	1.65	2.65	Feasible
5	Durian	7.80	Adequate	1.11	2.11	Feasible

4. Conclusion

The research study concluded that the types of multipurpose plants (MPTS) grew and produced in the Community Forest (CF) land of Meranti Wana

Makmur farmer group, Lubuk Bintialo village, which were feasible to be developed as priority crops were: Jackfruit, Djenkol bean, Petai bean and Durian. Based on the analysis of the market level and social acceptance in the Priority Plus Index (PPI) method, it

is stated that the four plants have a fairly good marketing potential and included as the types of plants whom socially understood and developed by farmers, and according to the feasibility test through a benefit analysis the four types of commodities in the "profitable" category.

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